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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/662,195	09/12/2003	Dae-Ig Chang	3364P138	9367

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BLAKELY SOKOLOFF TAYLOR & ZAFMAN
12400 WILSHIRE BOULEVARD
SEVENTH FLOOR
LOS ANGELES, CA 90025-1030

EXAMINER
BOCURE, TESFALDET

ART UNIT	PAPER NUMBER
2611	

MAIL DATE	DELIVERY MODE
05/17/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/662,195	CHANG ET AL.
	Examiner	Art Unit	
	Tesfaldet Bocure	2611	

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2007*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

　　4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 September 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

　　Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

　　Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

　　a)☒ All　b)☐ Some * c)☐ None of:

　　　　1.☒ Certified copies of the priority documents have been received.

　　　　2.☐ Certified copies of the priority documents have been received in Application No. _____.

　　　　3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

　　* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date *9/12/03*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Priority

1.   Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which

papers have been placed of record in the file.

It should be noted that the Priority paper were not properly acknowledged

Information Disclosure Statement

2.   The Examiner has considered the Information Disclosure Statement (IDS)

received on 9/12/03 and the initialed copy (one page) of the IDS is attached with this

correspondence.

It should be noted that the IDS of 9/12/03 was not properly acknowledged.

Drawings

3.   Figure s 1 and 2 should be designated by a legend such as --Prior Art-- because

only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in

compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid

abandonment of the application. The replacement sheet(s) should be labeled

"Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct

any portion of the drawing figures. If the changes are not accepted by the examiner, the

applicant will be notified and informed of any required corrective action in the next Office

action. The objection to the drawings will not be held in abeyance.

Previously Indicated Allowable Subject Matter

4.   The indicated allowability of claims 2-6 is withdrawn in view of the newly

discovered reference(s) to Wang (Soft Decision Generation for QAM with Channel

Estimation Error, IEEE) in view of Applicant's Owned Admitted Prior Art (AOAPA)

(figures 1 and 2) . Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

6.   This application currently names joint inventors. In considering patentability of

the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation

under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g)

prior art under 35 U.S.C. 103(a).

7.   Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Michael Mao Wang et al., Wang hereinafter (Soft Decision Generation for QAM with

Channel Estimation Error, IEEE) in view of Applicant's Owned Admitted Prior Art,

AOAPA hereinafter (figures 1 and 2)

Wang teaches a soft decision for a QAM with channel estimation error

comprising: a first log likelihood calculator (see first max in equation 14); a second log

likelihood calculator (second max in equation 14); and subtractor (see subtractor for

subtracting the first and second max).

The first and second loge likelihood calculator incorporates the signs (positive

and negative) of the signals (see s: ck= -1 and +1 in equation 14).

What Wang fails to teach is that the log likelihood is compared by comparator for

calculating the difference of the log likelihood ratios of the subtractor, and determining

the QAM to positive or negative according to the state of the calculation result as in

claim 1.

AOAPA for the same endeavor as the instant application and that of Wang

teaches that the comparator 30 shown in fig. 1 compares the subtracted value of the

first and second log likelihood and generating a positive or negative value of the QAM

signal. Therefore, it would have been obvious to one of an ordinary skill in the art to use

to comparator of AOAPA for generating a maximum likelihood value of the received

QAM signal at the time the invention was made.

It should be noted that the AOAPA have the first and the second calculators and

subtractors as shown in fig. 1 however, it differs from the claimed subject matter in that

the admitted prior art does not put in consideration the channel estimation error when

calculating log likelihood. Therefore, either of the prior art can be as primary references

in rejecting claim 1.

Further to claims 2, 3 and 5, Wang also teaches that the log likelihood equation

having inherent multipliers for multiplying the channel estimation with the reference

signal; subtracting the multiplied values $(s\alpha)$ by the multiplier by the received signal $(x-s\alpha)$; squaring the subtracted value $((x-s\alpha)^2)$; second squaring the reference signal

received signal $((s)^2)$; adding the second squared value and the ratio of the noise

bandwidth (ζ); and dividing the squared value by the added values (see dividing the $(x-s\alpha)/((s)^2\zeta+1)$.

It should be noted that the ratio of the effective channel estimation filter noise and

QAM symbol noise bandwidth ζ has been calculated σ^2_n / σ^2_e, however if the ration is

calculated as σ^2_e / σ^2_n, the equation would have the same addition of the squared value

by the ratio as claimed as in claims 2,3 and 5.

Further to claims 4 and 6 Wang clearly shows in equation 14 as in claims 4 and 6

except the ratio of the effective channel estimation filter noise and QAM symbol noise

bandwidth ζ has been calculated σ^2_n / σ^2_e, however if the ratio is calculated as σ^2_e / σ^2_n, the claimed equation in claims 4 and 6 would have the same result as that of equation

14 in of Wang.

What Wang fails to teach is that the first and second log likelihood calculated

values compared by the comparator as in claims 1,2,3 and selecting the minimum

value from the values inputted and outputting likelihood ratio for soft decision as in claim

5.

AOAPA for the same endeavor as the instant application and that of Wang

teaches that the comparator 30 shown in fig. 1 compares the subtracted value of the

first and second logs likelihood and generates a positive or negative value of the QAM

signal. Therefore, it would have been obvious to one of an ordinary skill in the art to use

to comparator of AOAPA for generating a maximum likelihood value of the received

QAM signal at the time the invention was made.

Conclusion

8.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. US patent numbers 5,657,354, 6,975,669, Patent Publication

number 2006/0078075 and IEEE publication "On Reliability Metrics for Soft-Input

Decoding in Presence of Channel estimation Errors" to Thesling et al., Ling et al.,

Stamoulis et al. and Mustapha respectively disclose a soft decision decoder having a

log likelihood detector for calculating log likelihood of the received signal by

incorporating the channel estimation error.

9.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Tesfaldet Bocure whose telephone number is (571) 272-

3015. The examiner can normally be reached on Mon-Thur (7:30a-5:00p) & Mon.-Fri

(7:30a-5:00p).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Jayanti (Jay) Patel can be reached on (571) 272-2988. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Tesfaldet Bocure
Primary Examiner
Art Unit 2611

T.Bocure